

and specification pages 3-4, in view of Heidemann, U.S. Patent No. 5,335,109. The Examiner also discussed Hayata, JP 5-291667.

REJECTIONS UNDER 35 U.S.C. §103

Applicants respectfully disagree with the Examiner that the cited art teaches or suggests the present invention.

As discussed in the response dated November 16, 1999, the present invention recited in claims 15, 16 and 17 is designed upon a configuration of:

1. an input optical signal divided by an optical coupler;
2. an optical amplifier amplifies one optical signal divided by the optical coupler;
3. a filter filters the other optical signal divided by the optical coupler; and
4. a photo diode receives the optical signal filtered through the optical filter.

To the contrary, Fig. 15 of the present application has the configuration of:

1. an input optical signal is divided by an optical coupler;
2. an optical amplifier amplifies one optical signal divided by the optical coupler; and
3. a photo diode receives the other optical signal divided by the optical coupler.

Thus, Fig. 15 fails to teach a filtering stage when compared to the presently claimed invention.

As discussed previously, the Examiner indicates that Hayata discloses an optical amplifier with an input terminal and an optical coupler, a detector, and an optical fiber amplifier. In Hayata, however, an optical fiber amplifier is provided between an optical signal input terminal and wavelength branch unit 6, the wavelength branch unit 6 is used to separate an optical signal amplified by an optical fiber amplifier from an exciting light sent through another optical fiber amplifier provided at the next stage.

The wavelength branch unit 6 in Hayata is not an optical coupler which divides and optical input signal to a first and second optical signals as defined in claims 15 and 16. Further, Hayata neither discloses nor suggests that an optical filter could be provided between wavelength branch unit 6 and photo detector 7. Thus, Hayata does not divide an optical input signal.

In regard to the Heidermann reference, this teaching discloses:

1. an input optical signal filtered by filter 6a;
 2. an erbium-doped optical fiber which amplifies an optical signal filtered through filter 6a;
 3. filter 6b filters an optical signal amplified by erbium-doped optical fiber;
- and
4. photo diode which receives all the optical signals filtered through filter 6b.

Thus, Heidermann does not teach dividing a signal and either amplifying or filtering the signal when compared to the present invention.

Thus, a combination of Fig. 15 with the Heidemann reference would be inoperative. In Fig. 15 of the present application, a photo diode monitors an optical signal which is not amplified, and therefore, the photo diode is provided for a different

purpose or in a different position than that in Heidemann. In Heidemann, a photo diode neither detects nor monitors a preamplified optical signal. In the above configuration of Heidemann, it should be considered that the photo diode has a function such that:

1. the photo diode receives all optical signals flowing through an optical transmission line, but not any part of the optical signal; and
2. the photo diode receives amplified optical signals but not any part of the preamplified optical signals.

Therefore, it would not be possible to apply the photo diode of Heidemann in Fig. 15 of the present application, because the photo diode in Heidemann in Fig. 15 of the present application respectively have different purposes and are provided in different positions and configurations. Thus, structural limitations such as current and power ratings would differ accordingly.

In regard to the Hayata reference, no combination of the Hayata reference and the Heidemann reference would teach the presently claimed invention for the reasons discussed above. Specifically, the Hayata reference does not divide an optical input signal as presently claimed.

Moreover, it is clear that the presently claimed invention is not taught or suggested by the cited art as in the presently claimed invention, the filter is in the photo diode branch of the circuit and not in the amplifier branch of the circuit.

The cited art fails to provide a teaching as to why it would be obvious to connect the filter in one branch of the circuit as opposed to another.

It is known that an effect due to the non-linearity characteristics of an optical fiber transmission line may cause problems so that the power level of an optical signal

transmitted through the optical fiber transmission line is not controlled to be more than a predetermined value.

On the other hand, if the level of an optical signal becomes lower, the optical signal may be covered with a noise signal, and the ratio may deteriorate.

To avoid such a problem, it is necessary to control an optical output to become of a predetermined level of an optical amplifier provided on the optical fiber transmission line. As an example, the ALC control is employed to control the optical output to become of the predetermined level.

In the prior art, as shown in Fig. 15 of the present application, where optical lights are input to an optical amplifier are branched, optical lights other than an optical signal light are also input to a photo diode and, therefore, it is difficult to control the level of the optical signal and the optical amplifier (see specification page 3, line 25 to page 4, line 2).

Accordingly, in the present invention, an optical filter which filters an optical signal light is provided before the photo diode, so that the optical lights, other than the optical signal light are deleted in the photo diode branch. An appropriate gain control for the optical amplifier amplifying the optical signal light is also possible. See specification, page 12, line 24-page 13, line 8 for further discussion.

Accordingly, it is respectfully requested that all rejections under 35 U.S.C. §103 are withdrawn.


CLOSING

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that independent claims 15-16 and 18-19 are in condition for allowance as well as those claims dependent therefrom. Passage of this case to allowance is earnestly solicited.

However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper, not fully covered by an enclosed check, may be charged on Deposit Account 08-1634.

Respectfully submitted,


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